

Claims.

1. An automotive engine oil comprising a base oil and an antiwear additive system comprising an ester which is the reaction product of
 - (a) at least one polyfunctional alcohol;
 - (b) a dimer fatty acid; and
 - (c) optionally at least one of an aliphatic dicarboxylic acid having 5 to 18 carbon atoms, an aliphatic monocarboxylic acid having 5 to 24 carbon atoms and an aliphatic monofunctional alcohol having 5 to 24 carbon atoms
 with the resultant ester having a kinematic viscosity at 100 °C ranging from 500 to 5000 mm²/s and a non-polarity index (NPI)

$$\text{NPI} = \frac{\text{total number of carbon atoms} \times \text{molecul. weight}}{\text{number of carboxylate groups} \times 100}$$
 of at least 500.
2. An automotive engine oil comprising a base oil and an antiwear additive system comprising an ester which is the reaction product of
 - (a) at least one polyfunctional alcohol;
 - (b) a dimer fatty acid; and
 - (c) at least one of an aliphatic dicarboxylic acid having 5 to 18 carbon atoms, an aliphatic monocarboxylic acid having 5 to 24 carbon atoms and an aliphatic monofunctional alcohol having 5 to 24 carbon atoms
 with the resultant ester having a kinematic viscosity at 100 °C ranging from 500 to 5000 mm²/s and a non-polarity index (NPI)

$$\text{NPI} = \frac{\text{total number of carbon atoms} \times \text{molecul. weight}}{\text{number of carboxylate groups} \times 100}$$
 of at least 500.
3. An automotive engine oil according to either of claims 1 and 2 wherein (c) is an aliphatic dicarboxylic acid having 5 to 18 carbon atoms.
4. An automotive engine oil according to any of claims 1 to 3 wherein the polyfunctional alcohol is a polyol of formula R(OH)_n where n is an integer which ranges from 1 to 10 and R is a hydrocarbon chain of 2 to 15 carbon atoms where the polyol is of molecular weight in the range from 50 to 650.
5. An automotive engine oil according to any of claims 1 to 4 wherein the resultant ester has a kinematic viscosity at 100⁰ °C of 900 to 4000 mm²/s.

- 14
6. An automotive engine oil according to any of claims 1 to 5 wherein the resultant ester has an NPI value of at least 900.
7. An automotive engine oil according to any of claims 1 to 6 wherein the resultant ester has an average molecular weight of at least 3000.
8. An automotive engine oil according to any of claims 1 to 7 wherein the resultant ester is the reaction product of neopentylglycol with dimer acid and azeleic acid.
- 10 9. An automotive engine oil according to any of claims 1 to 8 wherein the antiwear additive system further comprises a phosphorus-containing and/or sulphur-containing antiwear additive.
- 15 10. An automotive engine oil according to claim 9 wherein the further antiwear additive is both a phosphorus-containing and sulphur-containing additive.
11. An automotive engine oil according to either of claims 9 or 10 wherein the further antiwear additive is zinc dialkyl dithiophosphate
- 20 12. A method of reducing wear in an automotive engine by the use of an automotive engine oil comprising a base oil and an antiwear additive system comprising an ester which is the reaction product of
- (a) at least one polyfunctional alcohol;
- (b) a dimer fatty acid; and
- 25 (c) optionally at least one of an aliphatic dicarboxylic acid having 5 to 18 carbon atoms, an aliphatic monocarboxylic acid having 5 to 24 carbon atoms and an aliphatic monofunctional alcohol having 5 to 24 carbon atoms
- with the resultant ester having a kinematic viscosity at 100 °C ranging from 500 to 5000 mm²/s and a non-polarity index (NPI)
- 30
$$\text{NPI} = \frac{\text{total number of carbon atoms} \times \text{molecul. weight}}{\text{number of carboxylate groups} \times 100}$$
- of at least 500.
13. Use of an automotive engine oil comprising a base oil and an antiwear additive system comprising an ester which is the reaction product of
- 35 (a) at least one polyfunctional alcohol;
- (b) a dimer fatty acid; and

- (c) optionally at least one of an aliphatic dicarboxylic acid having 5 to 18 carbon atoms, an aliphatic monocarboxylic acid having 5 to 24 carbon atoms and an aliphatic monofunctional alcohol having 5 to 24 carbon atoms with the resultant ester having a kinematic viscosity at 100 °C ranging from 500 to 5000 mm²/s and a non-polarity index (NPI)
- NPI = $\frac{\text{total number of carbon atoms} * \text{molecul. weight}}{\text{number of carboxylate groups} * 100}$
- of at least 500 to reduce wear in an automotive engine.

- 10 14. Use of an antiwear additive system comprising an ester which is the reaction product of

- (a) at least one polyfunctional alcohol;
- (b) a dimer fatty acid; and
- (c) optionally at least one of an aliphatic dicarboxylic acid having 5 to 18 carbon atoms, an aliphatic monocarboxylic acid having 5 to 24 carbon atoms and an aliphatic monofunctional alcohol having 5 to 24 carbon atoms with the resultant ester having a kinematic viscosity at 100 °C ranging from 500 to 5000 mm²/s and a non-polarity index (NPI)
- NPI = $\frac{\text{total number of carbon atoms} * \text{molecul. weight}}{\text{number of carboxylate groups} * 100}$
- of at least 500 in an automotive engine oil.

15. A method of reducing wear in an automotive engine by the addition of an automotive engine oil comprising a base oil and an ester which is the reaction product of
- (a) at least one polyfunctional alcohol;
- (b) a dimer fatty acid; and
- (c) optionally at least one of an aliphatic dicarboxylic acid having 5 to 18 carbon atoms, an aliphatic monocarboxylic acid having 5 to 24 carbon atoms and an aliphatic monofunctional alcohol having 5 to 24 carbon atoms with the resultant ester having a kinematic viscosity at 100 °C ranging from 500 to 5000 mm²/s and a non-polarity index (NPI)
- NPI = $\frac{\text{total number of carbon atoms} * \text{molecul. weight}}{\text{number of carboxylate groups} * 100}$
- of at least 500 wherein the automotive engine oil has a phosphorus level of no more than 0.08%.

16. An antiwear additive system comprising an ester which is the reaction product of

(a) at least one polyfunctional alcohol;

(b) a dimer fatty acid; and

(c) optionally at least one of an aliphatic dicarboxylic acid having 5 to 18 carbon

atoms, an aliphatic monocarboxylic acid having 7 to 24 carbon atoms and an

aliphatic monofunctional alcohol having 7 to 24 carbon atoms

with the resultant ester having a kinematic viscosity at 100 °C ranging from 500 to 5000 mm²/s and a non-polarity index (NPI)

$$\text{NPI} = \frac{\text{total number of carbon atoms} \times \text{molecul. weight}}{\text{number of carboxylate groups} \times 100}$$

number of carboxylate groups x 100

of at least 500.

17. An automotive engine comprising an automotive engine oil comprising a base oil

and an antiwear additive system comprising an ester which is the reaction product of

(a) at least one polyfunctional alcohol;

(b) a dimer fatty acid; and

(c) optionally at least one of an aliphatic dicarboxylic acid having 5 to 18 carbon

atoms, an aliphatic monocarboxylic acid having 5 to 24 carbon atoms and an

aliphatic monofunctional alcohol having 5 to 24 carbon atoms

with the resultant ester having a kinematic viscosity at 100 °C ranging from 500 to 5000 mm²/s and a non-polarity index (NPI)

$$\text{NPI} = \frac{\text{total number of carbon atoms} \times \text{molecul. weight}}{\text{number of carboxylate groups} \times 100}$$

number of carboxylate groups x 100

of at least 500.